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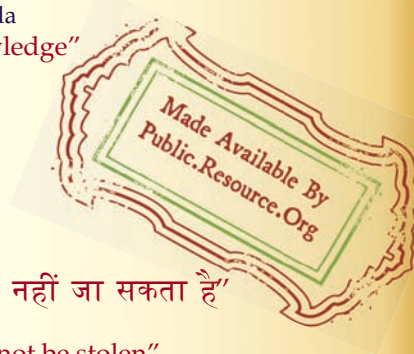
IS 15074-1 (2002): Packaging of Non-Electric Detonators,
Part 1: Wooden Cases [CHD 26: Explosives and Pyrotechnics]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
अविद्युत अधिस्फोटकों की पैकेजबंदी — विशिष्टि
भाग 1 लकड़ी की पेटियाँ

Indian Standard
PACKAGING OF NON-ELECTRIC
DETONATORS—SPECIFICATION
PART 1 WOODEN CASES

ICS 55.160; 71.100.30; 79.040

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Explosives and Pyrotechnics Sectional Committee had been approved by the Chemical Division Council.

In view of the dissimilarity in the constructional features of wooden cases for packing electric and ordinary (non-electric) detonators, separate specifications are being formulated for packing of electric and non-electric detonators. Different types of packing like wooden cases, fibre-board cases etc, are used for packing of detonators. Hence separate standards are being formulated for each type of packing as different part to this standard. This standard Part 1 Wooden cases covers the general requirements of wooden cases for packing of non-electric detonators, while Part 2 Fibre-board cases will be formulated in due course of time.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of specified value in this standard.

Indian Standard

PACKAGING OF NON-ELECTRIC DETONATORS — SPECIFICATION

PART 1 WOODEN CASES

1 SCOPE

This standard covers the general requirements of inner and outer wooden packing cases for packing non-electric detonators of plain and super plain types.

2 REFERENCES

The following Indian Standards contain provision which through reference in this text, constitute the provisions of the standards. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
303 : 1989	Specification of plywood for general purposes (<i>third revision</i>)
707 : 1976	Glossary of terms applicable to timber technology and utilization (<i>second revision</i>)
723 : 1972	Steel countersunk head wire nails (<i>first revision</i>)
848 : 1974	Specification for synthetic resin adhesives for plywood (phenolic and aminoplastic) (<i>first revision</i>)
1084 : 1994	Manila ropes (<i>fourth revision</i>)
3097 : 1980	Specification for veneered particle boards (<i>first revision</i>)
4834 : 1968	Specification for veneered wood boards for packing cases
4905 : 1968	Methods for random sampling
6662 : 1993	Specification for timber species suitable for wooden packaging
6703 : 1972	Glossary of wooden packaging terms
6760 : 1972	Slotted countersunk head wood screws

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definitions in addition to those given in IS 707 and IS 6703 shall apply.

3.1.1 *Objectionable Knots*

3.1.1.1 A live knot shall be considered objectionable if its diameter along the major axis exceeds 50 percent of the width of a board or batten subject to a maximum

of 75 mm, provided such knots are not more than one for a length of 20 cm of boards or battens or are knot situated within 25 mm from a place through which a nail will be driven, either in the shook or when the case is assembled.

3.1.1.2 A dead knot shall be considered objectionable if its diameter along the major axis exceeds 6 mm in the case of an unplugged knot or 25 mm in the case of a glued and plugged knot, provided such knots are not more than one for a length of 20 cm of the boards or battens or are situated within 25 mm from a place through which a nail will be driven, either in the shook or when the case is assembled.

3.1.2 *Shooks*

A set of components of definite dimensions intended to form a complete packing case when assembled, excluding fittings. The components may be fabricated to size components, that is, top, bottom, sides and ends of an unassembled packing case.

3.1.3 *Plain Detonator*

A metal tube closed at one end, charged with the initiating explosive consolidated under pressure, and left open at the other end. It is intended for use with safety fuse.

4 MATERIALS

4.1 Plywood

Unless otherwise specified, the plywood shall be of 3-ply conforming to the requirements of type BC, grade CWR of IS 303 and of thickness 6.5 ± 0.5 mm.

4.2 Timber

4.2.1 Solid timber used for shooks, corner posts and battens shall be from any of the species of Group 1 and Group 2 of IS 6662. It is preferable to select species of density between 400-600 kg/m³. The timber shall be seasoned to a moisture content not exceeding 18 percent and the inclination of the grain shall not exceed 1 in 10. The timber shall be free from centre heart (pith), insect attack, any kind of decay (rot), objectionable knots, warping, splits and any other defects which will reduce the strength or usefulness of the packing case. Pin holes (dead infestation) shall

be permissible provided they are not of powder post beetles and are scattered (not concentrated).

4.2.2 As far as possible, only one species of timber should be used in the manufacture of any one packing case. However, where different species are required to be used, the species shall be selected from the same group. In no circumstances for any one packing case different species of different groups shall be employed.

4.3 Veneered Shooks

These may be either Grade 2 veneered wood boards conforming to IS 4834 or veneered particle board conforming to IS 3097. The thickness of shooks shall be 12 mm. The veneers used shall be from timber species of Class I and Class II of IS 303.

4.4 Adhesives

Adhesives used for bending purpose shall be WWR or unextended CWR types conforming to IS 848.

4.5 Nails and Screws

Countersunk head nails conforming to IS 723 and screws conforming to IS 6760 shall be used in the assembly of inner and outer cases. The shank diameter of nails shall be not less than 20 mm. The length of the nails shall be not less than the sum of the thickness of boards and battens plus 6 mm. Such nails shall be covered with suitable material so as to effectively prevent exposure of iron or steel.

5 CONSTRUCTION

5.1 Components

The various components of the packing case shall be constructed as given below and shall conform to the requirements given in 6.

5.1.1 Veneers of Shooks

The direction of the grain of face veneers shall be parallel to the length of the case and at right angles to that of inner core.

The veneers shall be bonded on each side of the inner core by the application of adhesives (*see* 4.4) by applying a pressure of 0.28 MPa (2.8 kgf/cm²).

5.1.2 Core of Shooks

The inner core of shooks may be made in one or more wood pieces not less than 75 mm in width. The inner core may also be a complete particle board of the required width and length. Timber pieces of inner core if any, shall be joined with dowel pins to give a flush finished surface without any open seams. The dowel pins shall be securely fixed in the middle of the thickness of the shooks and parallel to the plain

surface with no projections through the surface. There shall be no dowel pin within 25 mm from the edge of the shook. Maximum number of joints permitted in one shook shall be as given below :

<i>Width of the Shook (cm)</i>	<i>Maximum No. of Joints Permitted</i>
Less than 15	1
15-30	2
More than 30	3

6 REQUIREMENTS

6.1 Workmanship and Assembly

6.1.1 Each case, consisting of an inner case and an outer case, shall be finished to proper workmanship and assembled as given in 6.1.2 to 6.1.8.

6.1.2 The inner case shall have plywood on the top and bottom. It shall have only veneered shooks on the other four sides. The shooks shall be joined to each other by dovetail joints further secured by GI screw (screw No. 4) (*see* IS 6760). The plywood sheet at the bottom shall be fastened to the side by GI screws and the top plywood sheet shall be fastened using brass screws (screw No. 4).

6.1.3 All the sides of the outer case shall be made of veneered shooks. The top and bottom shooks shall be attached to the box using GI screws. The shooks on the sides shall be joined to each other by dovetail joints and the joints shall be further secured by GI screws.

6.1.3.1 The inner case is placed inside the outer case using corner posts and battens as shown in Fig. 1.

6.1.4 All boards, battens and corner posts shall be of uniform thickness along that length. The faces of all wooden members shall be reasonably smooth and flat. All edges and corners shall be trimmed square and smooth.

6.1.5 The nails and screws wherever driven shall be so driven that neither the head nor the endpoint shall protrude from the surface.

6.1.6 The outer case shall be provided with 12 mm diameter manila or jute rope (*see* IS 1084) on each end shook for carrying or lifting the case. The rope shall be securely fastened by inserting its ends in two suitable holes provided in the end shook and properly knotting the ends of the rope inside the case.

6.1.7 Where the assembly of inner and outer case is completed, it shall be ensured that all corners are properly finished right angles and the tops and bottoms evenly tied to the sides for easy insertion of inner case in the outer case.

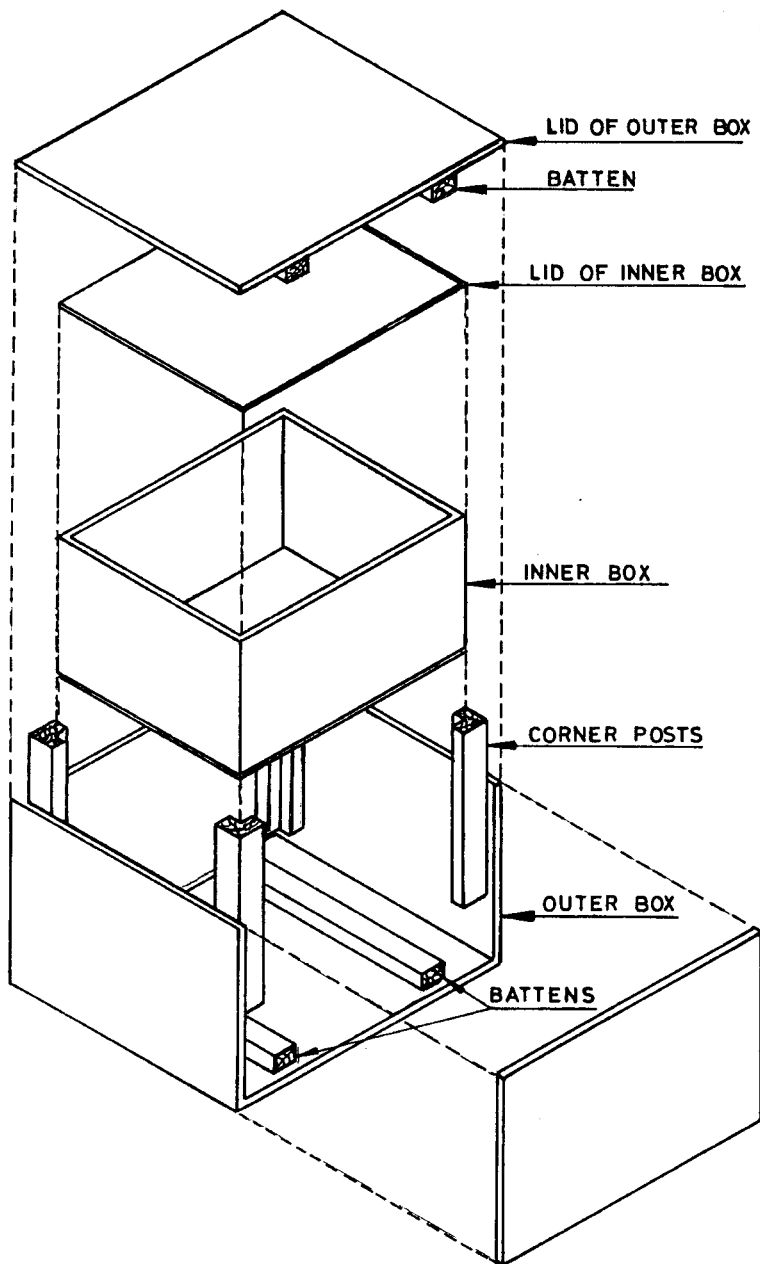


FIG. 1 WOODEN CASES FOR PACKING DETONATORS
(NON-ELECTRIC)

6.1.8 The inner case shall be freely and easily inserted in the outer case and there shall be no undue play between them. The movement of inner case shall not be more than 3 mm in any direction inside the outer case.

6.2 DIMENSIONS AND TOLERANCES

6.2.1 The dimensions of cases shall be as given below:

Dimension (mm)	Plain Detonators		Super Plain Detonators	
	Inner case	Outer case	Inner case	Outer case
Length	420	497	415	490
Width	298	375	295	370
Height	187	252	220	285

6.2.1.1 The tolerances on dimensions shall be as under:

Outer case	+ 2 mm, – 0 mm
Inner case	+ 0 mm, – 1 mm

6.2.2 Corner Posts

The cross-section of the corner posts shall be square (45 mm × 45 mm). 20 mm × 20 mm portion of the timber is removed from one of the corners to provide a groove so that when four of them are placed at the four corners of the outer case, the inner case when lowered shall be rigidly fixed at its four corners. The length of corner post shall be 235 ± 2 mm for plain detonators and 270 + 2 mm for super plain detonators.

6.2.3 The thickness and tolerance of plywood and shooks shall be as mentioned in 4.1 and 4.3. The length and width shall be such as to match with the dimensions of case (see 6.2.1).

6.2.4 Battens

The dimensions of battens used in the outer case shall be as given below:

Dimensions (mm)	Plain Detonators	Super Plain Detonators
Length	320	255
Breadth	32	34
Thickness	23	23
	} + 1	} +1

6.2.5 Gross Weight

The gross weight of the case with its contents shall not exceed 50 kg.

7 TESTS

The fully assembled case with simulated load (that is equivalent weight of saw dust and iron fillings) when dropped on a concrete surface from a height of 1.5 m, once on each of its sides, top and bottom (that is 6 times in total) shall not show any visible damage to the case.

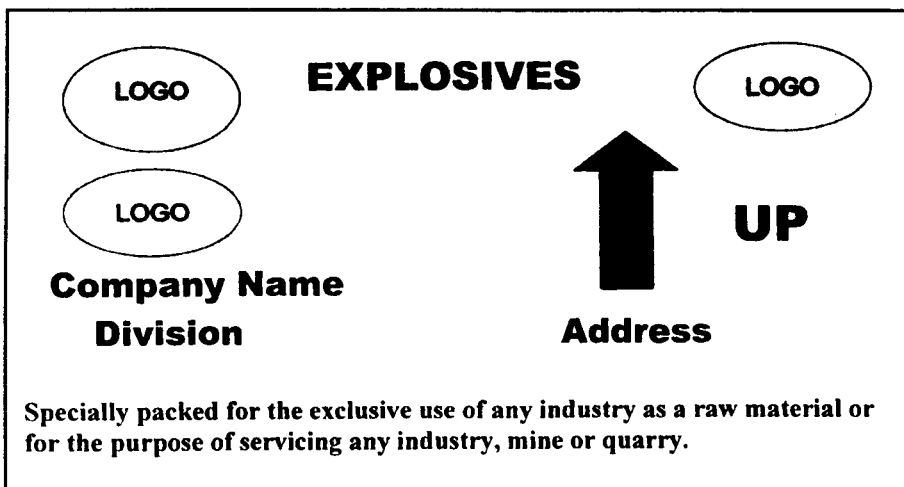
8 MARKING

Each case shall be legibly and indelibly stamped (stenciled) as given below on different sides (see Fig. 2).

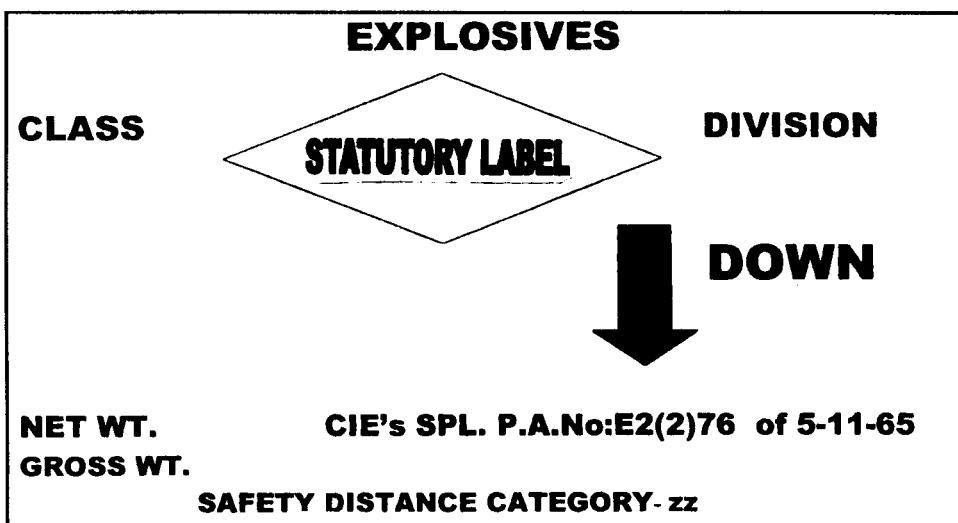
9 SAMPLING

Representative samples of the material shall be drawn and conformity of the material to specification shall be determined according to the procedure prescribed in Annex A.

a) Front Side



b) Back Side



c) Ends

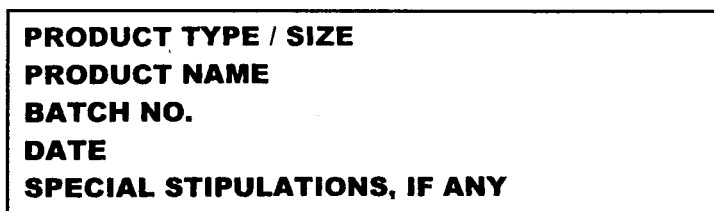


FIG. 2 LABELLING ON DIFFERENT SIDES

ANNEX A

(Clause 9)

SAMPLING OF WOODEN CASES FOR PACKING OF NON-ELECTRIC DETONATORS

A-1 SCALE OF SAMPLING

A-1.1 Lot

All the boxes produced from the same material under similar conditions shall constitute a lot.

A-1.2 For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

A-1.3 The number of boxes to be selected from a lot shall depend on the size of the lot and shall be according to Table 1.

A-1.3.1 Boxes shall be selected randomly. In order to ensure the randomness of selection, procedures given in IS 4905 may be followed.

A-2 NUMBER OF TESTS

A-2.1 The lot shall be tested for all the requirements as per 4 to 7.

A-3 CRITERIA FOR CONFORMITY

A-3.1 The lot shall be considered to have satisfied these requirements if the number of defectives found in the sample is less than or equal to the corresponding permissible number of defectives given in col 3 of Table 1.

Table 1 Scale of Sampling
(Clauses A-1.3 and A-3.1)

No. of Boxes in a Lot (1)	No. of Boxes to be Selected (2)	Permissible No. of Defectives (3)
Up to 500	13	1
501 to 1 200	20	1
1 201 to 3 200	32	2
3 201 to 10 000	32	2
10 001 and above	50	3

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

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Central Mine Planning & Design Institute Limited, Ranchi
Central Mining Research Institute, Dhanbad
Coal India Limited, Kolkata
Consumer Guidance Society of India, Mumbai
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This Indian Standard has been developed from Doc : No. CHD 26 (925).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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